

FIG. 1

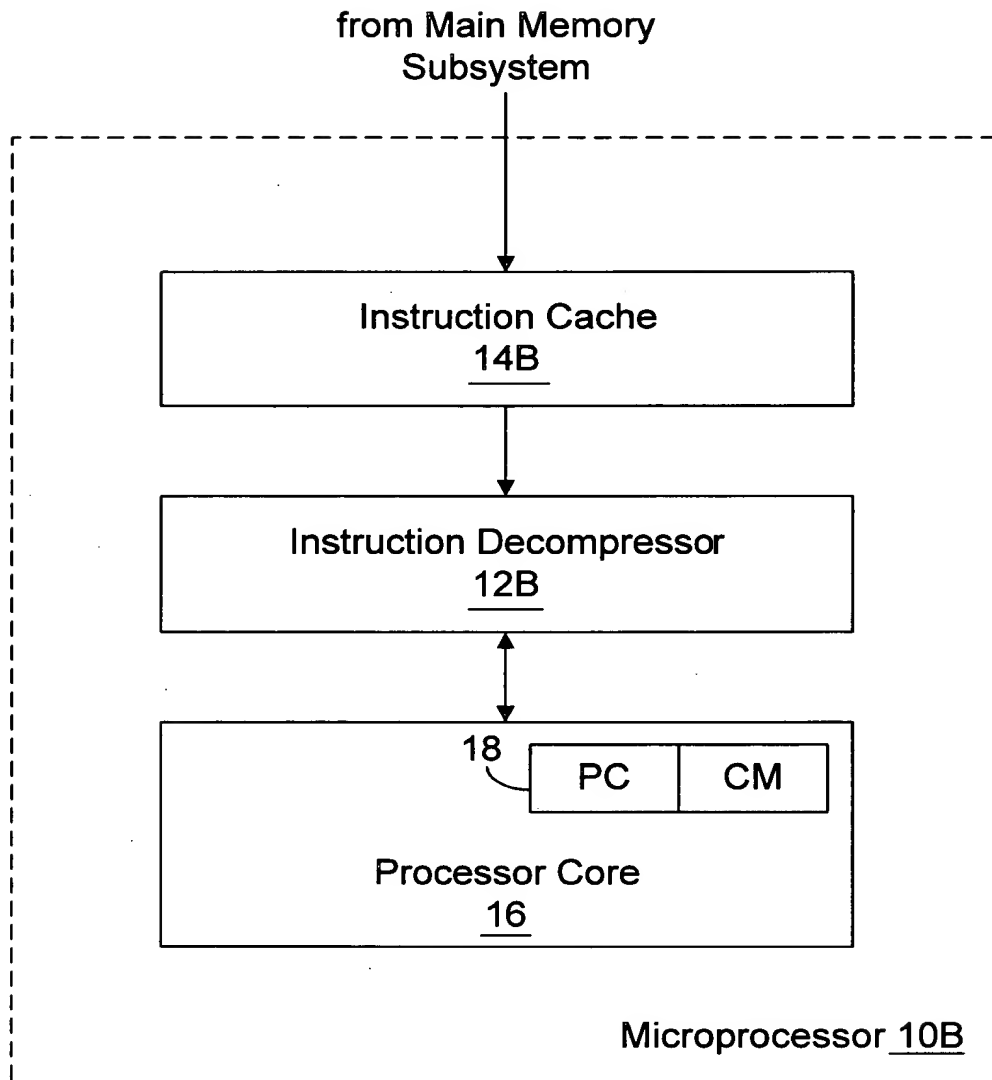
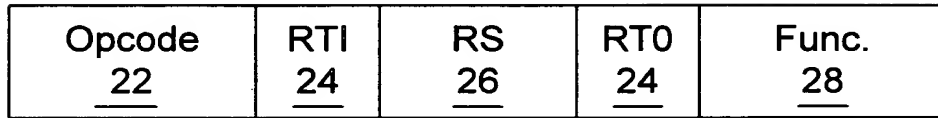
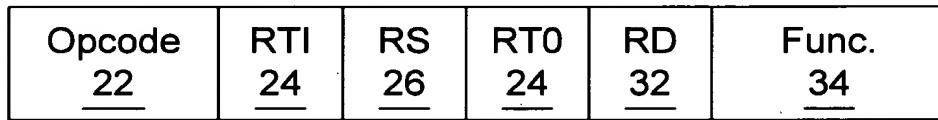


FIG. 2



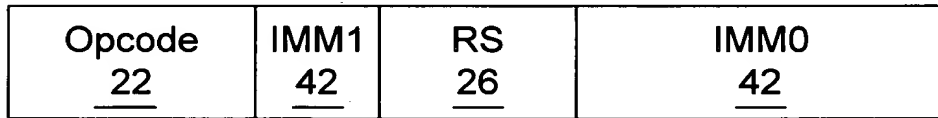
20 →

FIG. 3A



30 →

FIG. 3B



40 →

FIG. 3C



50 →

FIG. 3D

FIG. 3A

Extend <u>22</u>	0 <u>62</u>	IMM1 <u>64</u>	BR <u>66</u>	IMM2 <u>64</u>
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60 ↗

FIG. 4A

Extend <u>22</u>	IMM2 <u>72</u>	RT <u>74</u>	IMM1 <u>72</u>	Opcode <u>78</u>	RS <u>76</u>	IMM0 <u>72</u>
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70 ↗

FIG. 4B

Extend <u>22</u>	COP0 <u>86</u>	RT <u>74</u>	RD <u>82</u>	Special Opcode <u>78</u>	RS <u>76</u>	Func. <u>84</u>
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80 ↗

FIG. 4C

JAL Opcode <u>22</u>	EX <u>94</u>	IMM2 <u>92</u>	IMM1 <u>92</u>	IMM3 <u>92</u>	IMM0 <u>92</u>
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90 ↗

FIG. 4D

110

106 <u>OPCODE</u>	104 <u>FUNC.</u>	100 <u>INSTRUCTION</u>	102 <u>OPERANDS</u>
11	IMM5	LH	rt,rs
13	IMM5	LW	rt,xs
15	IMM5	LHU	rt,rs
17	IMM5	LW	rt,rs
18	IMM5	LB	rt,rs
19	IMM5	SH	rt,rs
1a	IMM5	SB	rt,rs
1b	IMM5	SW	rt,xs
1c	IMM5	LBU	rt,rs
1d		special	
1f	IMM5	SW	rt,rs
12	02	SLT	rs,rt
12	06	SLTU	rs,rt
12	08	MOVE	rs,xt
12	0a	SLT	rs,xt
12	0c	ADDU	rs,xt
12	0e	SLTU	rs,xt
12	10	MOVE	xs,rt
12	12	SLT	xs,rt
12	14	ADDU	xs,rt
12	16	SLTU	xs,rt
12	18	MOVE	xs,xt
12	1a	SLT	xs,xt
12	1c	ADDU	xs,xt
12	1e	SLTU	xs,xt

FIG. 5A

112

106 <u>OPCODE</u>	104 <u>FUNC.</u>	100 <u>INSTRUCTION</u>	102 <u>OPERANDS</u>
10	02	SRL	rt,imm3
10	03	SRA	rt,imm3
10	04	SLLV	rt,rs
10	06	SRLV	rt,rs
10	07	SRAV	rt,rs
10	08	JR	rs
10	09	JALR	xt,rs
10	0c	SYSCALL	imm6
10	0d	BREAK	imm6
10	10	ADD	rs,rt
10	12	SUB	rs,rt
10	13	NEG	rs,rt
10	14	AND	rs,rt
10	15	OR	rs,rt
10	16	XOR	rs,rt
10	17	NOT	rs,rt

FIG. 5B

114

106 <u>OPCODE</u>	104 <u>FUNC.</u>	100 <u>INSTRUCTION</u>	102 <u>OPERANDS</u>
12	01	ADDU	r0,rs,rt
12	03	SUBU	r0,rs,rt
12	05	ADDU	r1,rs,rt
12	07	SUBU	r1,rs,rt
12	09	ADDU	r2,rs,rt
12	0b	SUBU	r2,rs,rt
12	0d	ADDU	r3,rs,rt
12	0f	SUBU	r3,rs,rt
12	11	ADDU	r4,rs,rt
12	13	SUBU	r4,rs,rt
12	15	ADDU	r5,rs,rt
12	17	SUBU	r5,rs,rt
12	19	ADDU	r6,rs,rt
12	1b	SUBU	r6,rs,rt
12	1d	ADDU	r7,rs,rt
12	1f	SUBU	r7,rs,rt
16	imm	SLL	rd,rt,imm

FIG. 5C

116

106 <u>OPCODE</u>	100 <u>INSTRUCTION</u>	102 <u>OPERANDS</u>
00	BEQZ	xs,simm8
01	BNEZ	xs,simm8
04	BEQZ	rs,simm8
05	BNEZ	rs,simm8
08	MOVEI	rs,imm8
09	ADDIU	rs,simm8
0a	SLTI	rs,imm8
0b	SLTIU	rs,imm8
0c	ANDI	rs,imm8
0e	CMPI	rs,imm8

FIG. 5D

118

106 <u>OPCODE</u>	100 <u>INSTRUCTION</u>	102 <u>OPERANDS</u>
02	BR	simm11
0f	extend	imm11

FIG. 5E

120

108

100

102

<u>OPCODE</u>	<u>INSTRUCTION</u>	<u>OPERANDS</u>
04	BEQ	rs,rt,simm12
05	BNE	rs,rt,simm12
06	BLEZ	rs,simm12
07	BGTZ	rs,simm12
08	ADDI	rt,rs,simm12
09	ADDIU	rt,rs,simm12
0a	SLTI	rt,rs,simm12
0b	SLTIU	rt,rs,simm12
0c	ANDI	rt,rs,simm12
0d	ORI	rt,rs,simm12
0e	XORI	rt,rs,simm12
0f	LUI	rt,simm12
10	LB	rt,rs,simm12
11	LH	rt,rs,simm12
12	LWL	rt,rs,simm12
13	LW	rt,rs,simm12
14	LBU	rt,rs,simm12
15	LHU	rt,rs,simm12
16	LWR	rt,rs,simm12
18	SB	rt,rs,simm12
19	SH	rt,rs,simm12
1a	SWL	rt,rs,simm12
1b	SW	rt,rs,simm12
1e	SWR	rt,rs,simm12

FIG. 6A

122

109

100

102

<u>RT</u>	<u>INSTRUCTION</u>	<u>OPERANDS</u>
00	BLTZ	rs,simm12
01	BGEZ	rs,simm12
02	BLTZL	rs,simm12
03	BGEZL	rs,simm12
08	TGEI	rs,simm12
09	TGEIU	rs,simm12
0a	TLTI	rs,simm12
0b	TLTIU	rs,simm12
0c	TEQI	rs,simm12
0e	TNEI	rs,simm12
10	BLTZAL	rs,simm12
11	BGEZAL	rs,simm12
12	BLTZALL	rs,simm12
13	BGEZALL	rs,simm12

FIG. 6B

124

107

100

102

<u>FUNC.</u>	<u>INSTRUCTION</u>	<u>OPERANDS</u>
00	SLL	rd,rt,imm5
02	SRL	rd,rt,imm5
03	SRA	rd,rt,imm5
04	SLLV	rd,rt,rs
06	SRLV	rd,rt,rs
07	SRAV	rd,rt,rs
08	JR	rs
09	JALR	rd,rs
0c	SYSCALL	imm15
0d	BREAK	imm15
0f	SYNC	
10	MFHI	rd
11	MTHI	rs
12	MFLO	rd
13	MTLO	rs
18	MULT	rs,rt
19	MULTU	rs,rt,
1a	DIV	rs,rt
1b	DIVU	rs,rt

FIG. 6C

126

107 <u>FUNC.</u>	100 <u>INSTRUCTION</u>	102 <u>OPERANDS</u>
20	ADD	rd,rs,rt
21	ADDU	rd,rs,rt
22	SUB	rd,rs,rt
23	SUBU	rd,rs,rt
24	AND	rd,rs,rt
25	OR	rd,rs,rt
26	XOR	rd,rs,rt
27	NOR	rd,rs,rt
2a	SLT	rd,rs,rt
2b	SLTU	rd,rs,rt
30	TGE	rs,rt
31	TGEU	rs,rt
32	TLT	rs,rt
33	TLTU	rs,rt
34	TEQ	rs,rt
36	TNE	rs,rt

FIG. 6D

128

105

100

102

<u>RS,RT.</u>	<u>INSTRUCTION</u>	<u>OPERANDS</u>
00,*	MFC0	rt,rd
02,*	CFC0	rt,rd
04,*	MTC0	rt,rd
06,*	CTC0	rt,rd
08,00	BC0F	imm6
08,01	BC0T	imm6
08,02	BC0FL	imm6
08,03	BC0TL	imm6
1x,*	COP0	Func.(Fig.6F)

FIG. 6E

130

107

100

<u>FUNC.</u>	<u>INSTRUCTION</u>
01	TLBR
02	TLBWI
06	TLBWR
08	TLBP
10	RFE
18	ERET

FIG. 6F

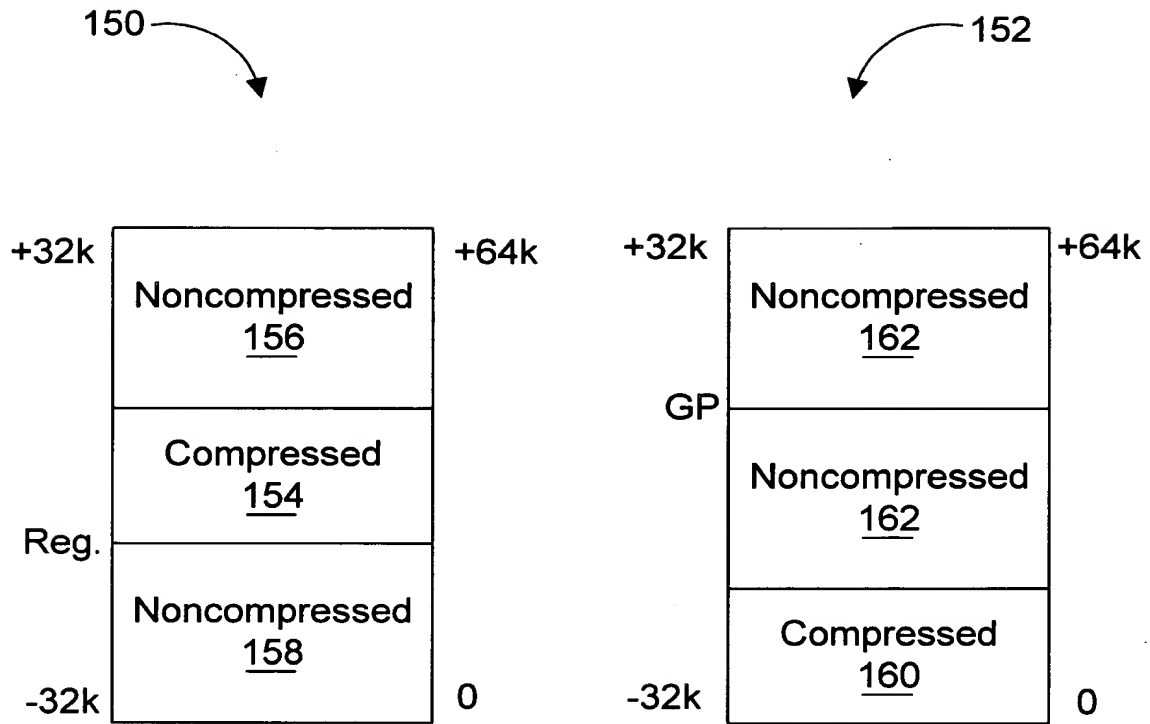


FIG. 7

from Instruction Cache 14B

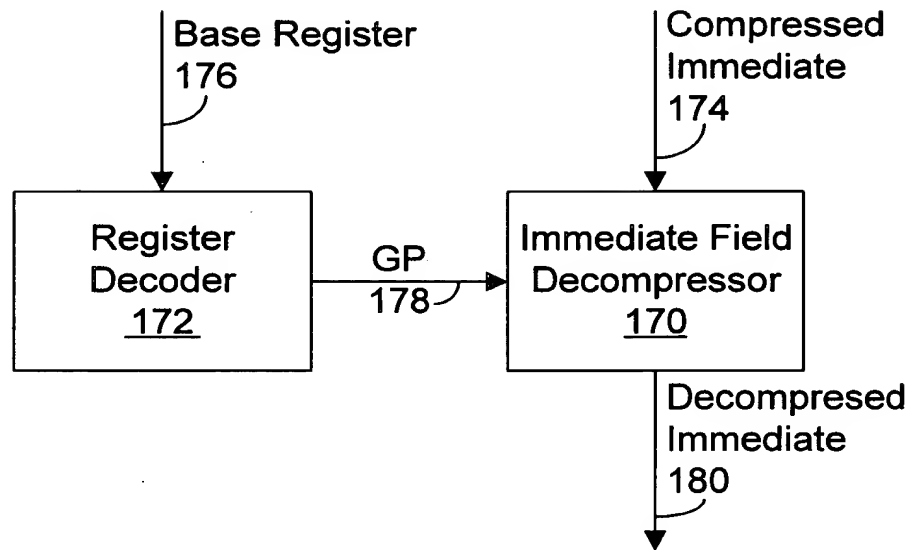


FIG. 8

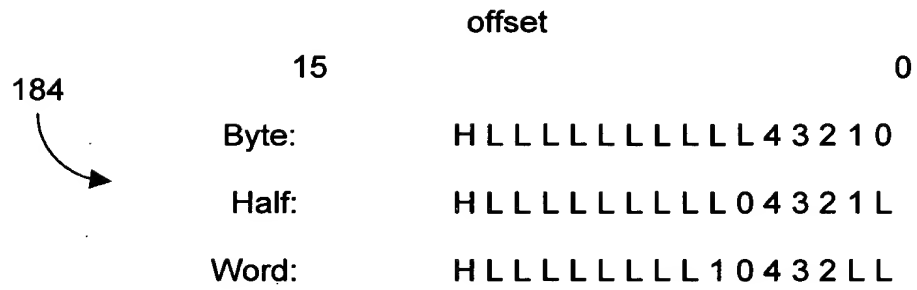
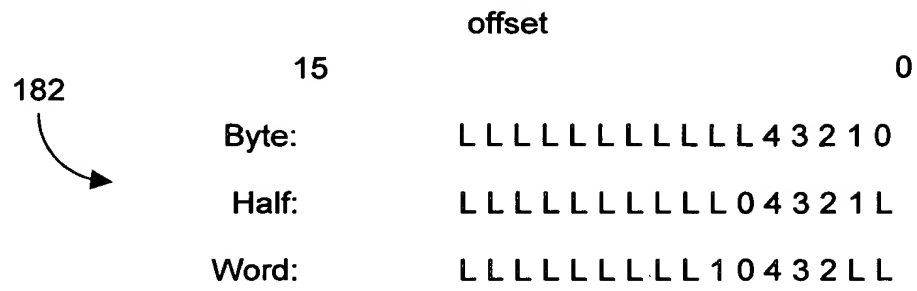


FIG. 9

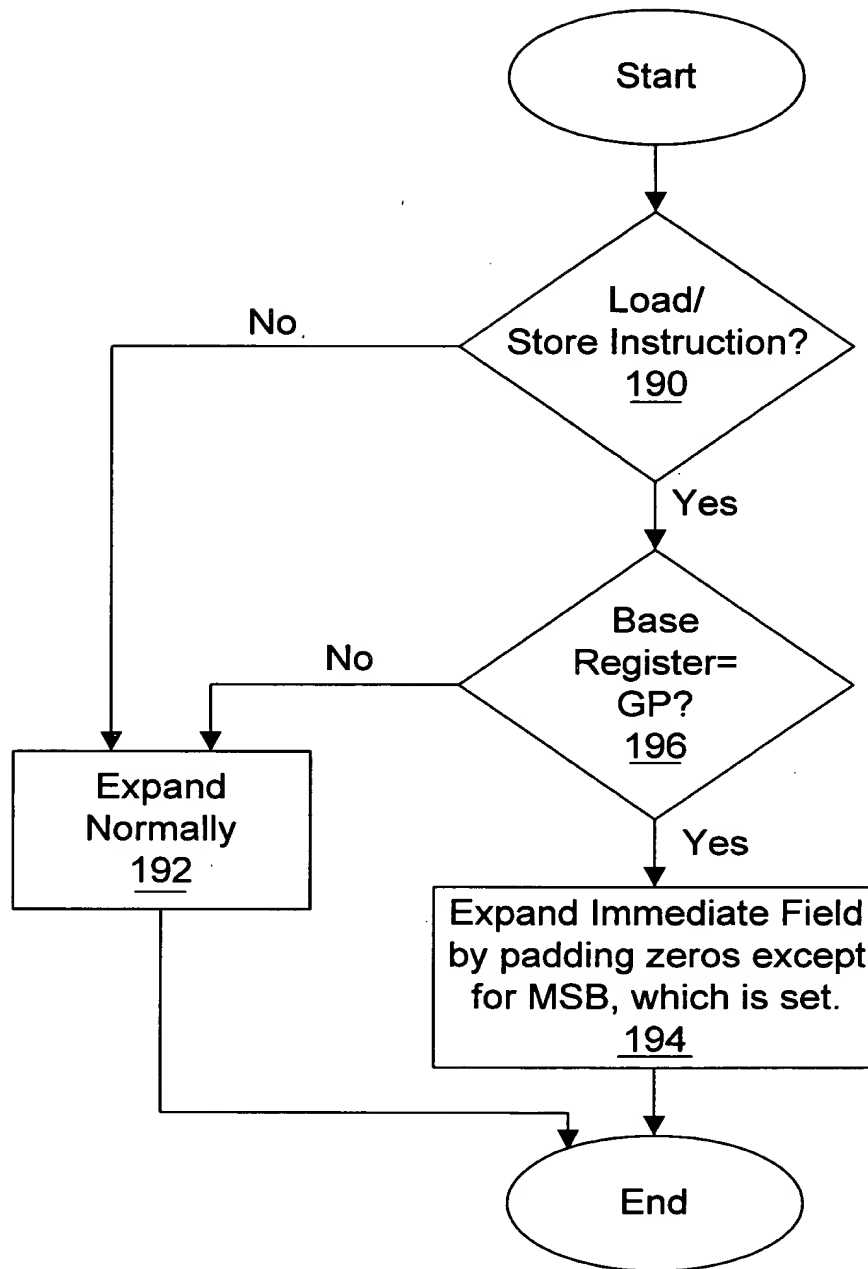


FIG. 10

from Instruction Cache 14B

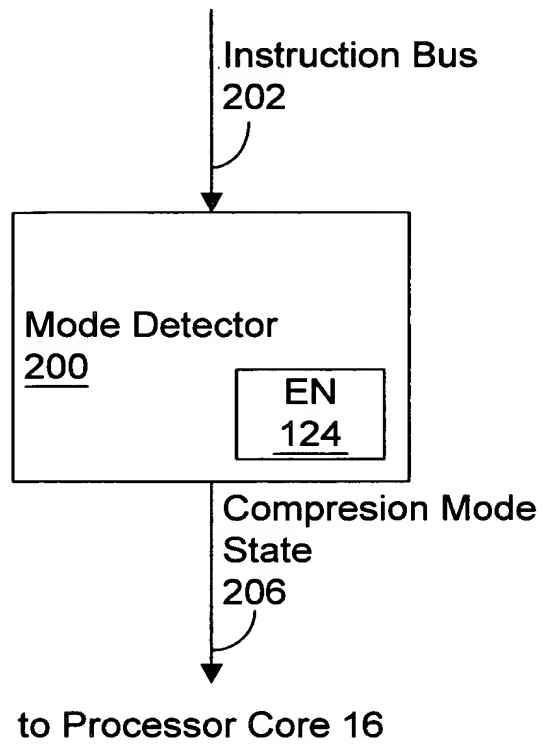


FIG. 11

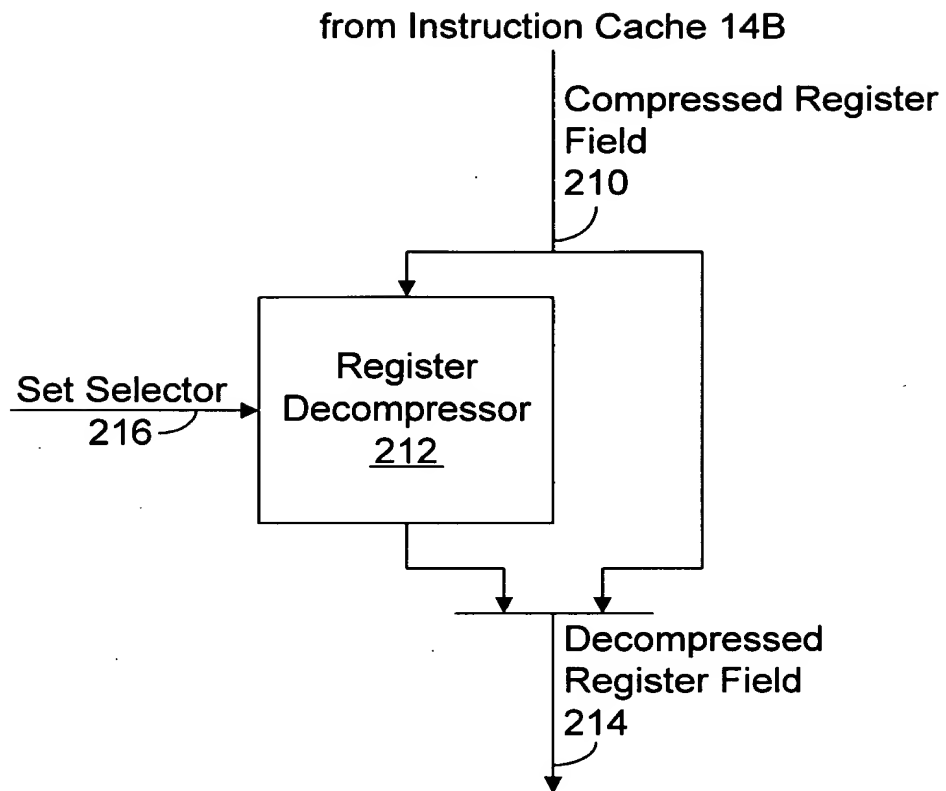


FIG. 12

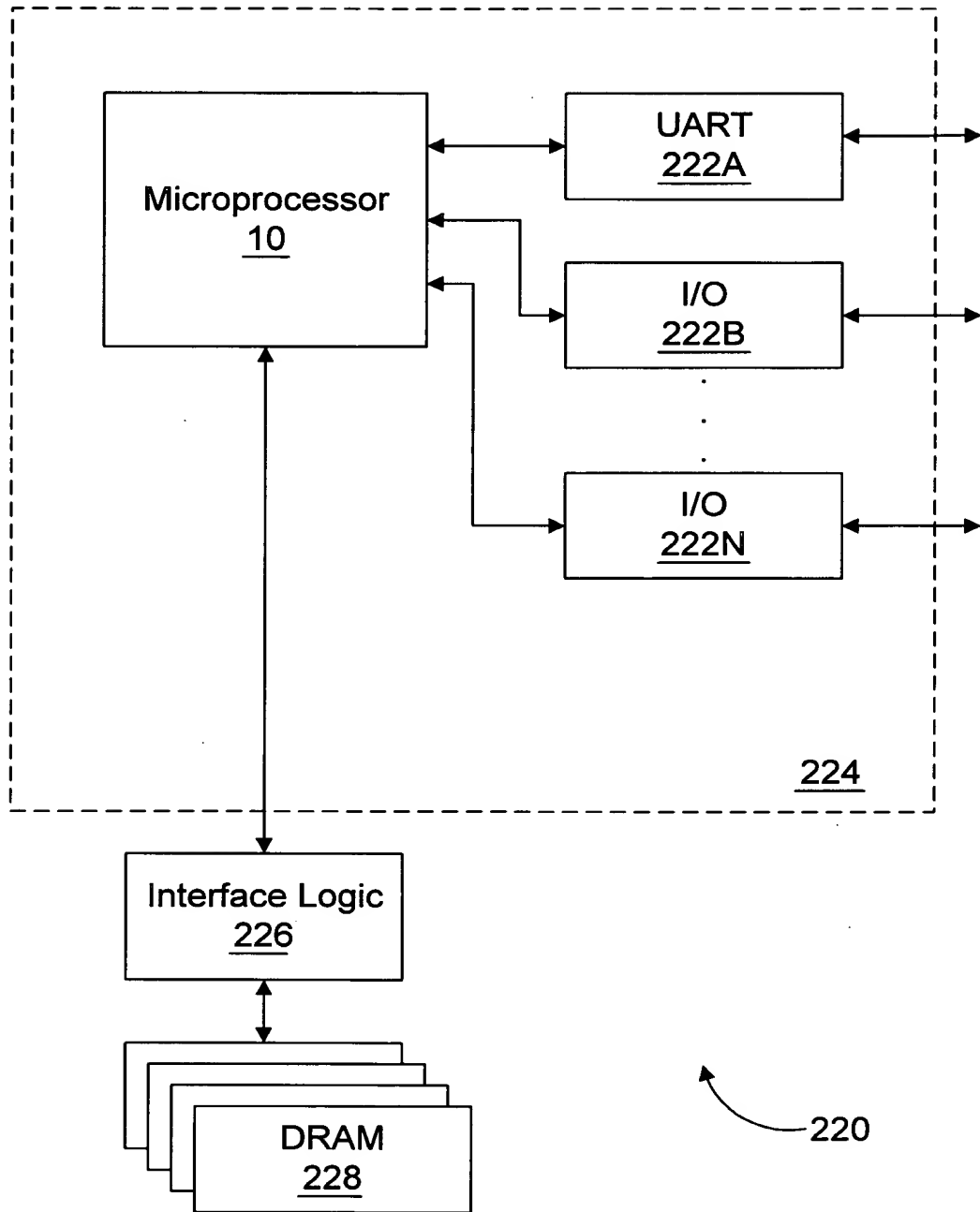


FIG. 13